Hydrogen Fueling Station Operations

DOE's Advanced Vehicle Testing Activity

Electric Transportation Applications

APS

Idaho National Laboratory

INL/CON-06-01109

- **Web Sites**
  AVTA - http://avt.inl.gov
  Hydrogen reports - http://avt.inl.gov/hydrogen.html
- **Contact**
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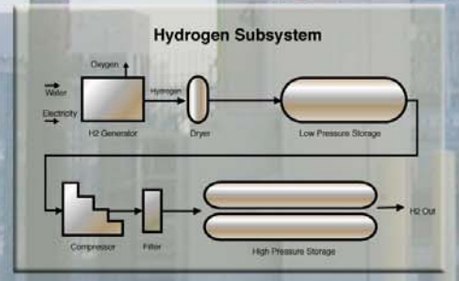
APS Alternative Fuel Pilot Plant

- **Partners**
  - Arizona Public Service
  - Electric Transportation Applications
  - U.S. Department of Energy's Advanced Vehicle Testing Activity
  - Idaho National Laboratory
- **Location**
  - Arizona Public Service Hydrogen/CNG Alternative Fuel Pilot Plant in downtown Phoenix, Arizona
- **Objectives**
  - Evaluate the safety and reliability of operating internal combustion engine (ICE) vehicles on hydrogen and blended hydrogen fuels
  - Evaluate the vehicle/infrastructure interface
  - Quantify vehicle emissions, costs, and performance
  - System optimization analysis, component testing, codes analysis, fleet education, and enhanced fueling practices
  - Support the development of a regional hydrogen fueling infrastructure

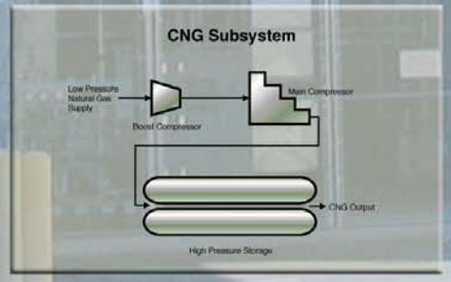
Hydrogen Subsystem

- Electrolytic hydrogen production on site
- Hydrogen generator
  -Proton Energy Systems' Hogen PEM fuel cell operating in reverse
- Fuel cell quality hydrogen - 99.9997% purity



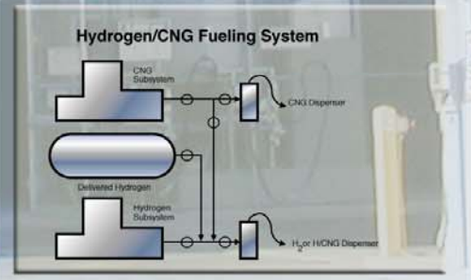
CNG Subsystem

- Compresses CNG from street service



Hydrogen/CNG Fueling Station

- Includes metering and electronic billing interface
- Dispenses either pure hydrogen or CNG fuel or H/CNG blended fuels



Prototype Dispenser

- Uses proportional flow control valves for hydrogen and CNG gas streams to control gas flow rates from 100 to 40,000 scfh
- Dispenser controller adjusts the control valves to provide real-time ratio control of blended fuels
- Control valves are trimmed by a digital dispenser controller using mass flow signals provided by coriolis mass flow transducers in the hydrogen and CNG gas streams
- Delivers 100% hydrogen at 5,000 psi. 100% CNG, and blends of HCNG (15, 20, 30, and 50% hydrogen - by volume) at 3,600 psi, using two independent single nozzles

Monitoring System

- Understand component, subsystems, and plant-level efficiencies & costs
- Real-time station & component monitoring @ 50 monitoring nodes (100 @ completion)
- Fuel quantities collected and costs calculated for pure hydrogen and HCNG blended fuels
- 7,200 kg of hydrogen produced